

agencies. While the rocks beneath a glacier are being worn and rounded, the stones set in the ice are in turn battered and scratched and often ground down to plane surfaces that are not infrequently polished and covered with glacial striæ.

As a rule, alpine glaciers follow pre-existing drainage valleys, which they enlarge and broaden. As frequently stated, a stream-cut gorge is distinctly V-shaped, but after being occupied by a glacier it is found to have become U-shaped in cross-section.

The records of glacial action looked for by geologists are: deposits of morainal material, which frequently differs from the adjacent country rock, and may occur in an irregular manner or be grouped definitely as lateral and terminal moraines; boulders perched in fortuitous positions, as on steep slopes and hill-tops; smoothly rounded rocky knolls; polished and scratched rock surfaces; rock-basins, &c.

NOTES

It is stated that the forthcoming "Life and Letters of Charles Darwin," by Mr. Francis Darwin, will contain a brief autobiographical fragment.

MR. MURRAY announces a new edition of Darwin's work on "The Expression of the Emotions in Man and Animals," with the author's latest corrections.

WE learn from the *Times* that Dr. Hermann Abich, the distinguished Austrian naturalist, died at Vienna on the 1st inst. at the advanced age of eighty years. He was born at Berlin on December 11, 1806, and attained the grade of Doctor in the University of that city before he was twenty-five. His first scientific tours were in Sicily and Italy. He then became Professor of Mineralogy at Dorpat, and devoted most of his leisure during his residence in Russia to travels in the Caucasus, Armenia, and Northern Persia. His earliest published work was on Vesuvius and Etna in 1833-34, and his latest seems to have been brought out in 1862 on the Geology of Daghestan. By his own request his remains were removed to Gotha for the purpose of cremation.

WITH reference to the recent catastrophe by which the King of Bavaria and his physician lost their lives, *Science* notes that Dr. Gudden is a sad loss to science, for he was one of the most noted authorities in the sphere of nervous and mental diseases. He has also been at the head of a laboratory in which investigations of the fine anatomy of the brain, spinal cord, and sense-organs have been carried on. He has given his name to a manner of studying the connections of the nervous system which is as ingenious as it has proved fruitful of results. His method consists in extirpating a sense-organ or other part of an animal when young, and then allowing the animal to grow up. At death the animal is examined, and the fibres which have failed to develop will thus be marked out as the paths of connection between the extirpated sense-organ and the brain-centre. For many years he had been at work on the problem as to the mode of connection between the retina and the brain, but his results are not yet before the public.

ACCORDING to *Science* the first circular of the local committee at Buffalo of the American Association for the Advancement of Science, announces that the meetings will be held in the recently enlarged high-school building. Reduced rates have been obtained over many of the railroads, most of which allow a return ticket at one-third of the usual fare. The Western Union Telegraph Company will place its lines and district telegraph system at the service of members. The Botanical Club of Buffalo is arranging an excursion and reception for the Botanical Section, and the local Entomological Club is doing the same kind service

for the Entomological Section. The address of the local secretary is Dr. Julius Pohlman, Buffalo, N. Y.

As our readers are aware, it has been resolved to mark the memorable event of the attainment, on August 31 next, of his hundredth year by the venerable father of modern science, "Le Doyen des Étudiants," as he loves to call himself—M. Chevreul—by striking a medal in his honour. The execution of this medal has been intrusted to M. Roty, old "pensioner" of the Academy of France, at Rome. Contributions towards the commemorative medal are, of course, not to be limited to France, but will embrace the whole scientific world, which everywhere alike claims the author who extended the bounds of science as its honoured citizen. Subscriptions, which will be received up to the 22nd of this month, may be addressed to the President of the Committee, 8, Rue Guy-de-la-Brosse, Paris. A list of the subscribers will accompany the medal, which is to be presented to M. Chevreul on his centenary day, and if the amount of the subscriptions allows of it, a copy of the medal will be sent to the subscribers.

AT the sitting, on June 7 last, of the Academy of Sciences at Paris, M. Halphen delivered an address in praise of the labours of M. Bouquet, his immediate predecessor in the seat he holds in that body. From the foundation of the Academy down to the present time, the duty of eulogising departed members has devolved exclusively on the Perpetual Secretaries at the anniversary meetings. The annual death-rate of members has, however, of late been such that a large number of them were in danger of disappearing from the roll without any formal record of their services. The initiative thus taken by M. Halphen was followed up at the next meeting. This step has, of course, been taken in imitation of the arrangements of the Académie Française, in accordance with which each incoming member is required to eulogise his predecessor at a special meeting, an answer being also given in the name of the Academy by another member appointed for that purpose.

RECENT soundings have given the following depths for the different Swiss lakes:—Constance, between Uttwyl and Friedrichshafen, 255 metres; Geneva, between Rivaz and Saint-Giugolphe, 256 metres; and between Lausanne and Evian, 330 metres; Brienne, 261; Thun, 217; Lucerne, between Gérard and Rueteren, 214 metres; Zug, 193; Neuchâtel, 153; Wallenstadt, 151; and Zürich, 143 metres.

ACCORDING to Prof. Heim, of Zürich, the total number of glaciers in the Alps is 1155, of which 249 have a length of more than 7500 metres. Of this number the French Alps contain 144, those of Italy 78, of Switzerland 471, and of Austria 462. The total superficial area of these glaciers is between three and four thousand square kilometres, those of Switzerland amounting to 1839 kilometres. The greatest length is reached by the Aletsch glacier, which is 24 kilometres long. As to thickness, it will be remembered that Agassiz, when measuring a crevasse in the Aar glacier, did not reach the bottom at 260 metres, and that he calculated the depth of the bed of ice at a certain point of this glacier at 460 metres.

WE have received the *Bulletin* for the past year of the Society for Indo-Chinese Studies of Saigon. Amongst the papers is one by that indefatigable student, Dr. Tirant, on the odoriferous woods of Cochin China, which, though numerous in variety, are of four principal kinds, the most important being aloes and sandalwood. We have already noticed a series of papers by the same writer on the fishes and reptiles of Cochin China. Another interesting paper deals with the textile plant *Sansevieria* as found in Cochin China.

A COMMISSION composed of MM. Becquerie, Berger, and Mascart, having been appointed to examine the question of the

safety or danger of erecting a tower to the height of 300 metres, as proposed, in the Champ de Mars, on the occasion of the forthcoming Universal Exhibition, has reported that there is no danger in connection with such a structure if special precautions are taken for its non-insulation. The tower acting as a lightning conductor would, on the contrary, they explain, serve to protect the whole of the Champ de Mars from injury by lightning if the rules laid down by the Commission on lightning conductors were applicable in the case of so exceptional an altitude.

THE report for the current year of the Coventry Free Public Library is a very encouraging document. It shows increase in all directions—in the number of borrowers, the number of books issued, and a large increase in the number of volumes owned by the Library. All the excellent work done by the Institution is paid for by a trifling rate producing a little over 500*l.*, supplemented by the assistance of a private book club. The tables appended by the Chairman, Mr. Odell, showing the number of books issued in each class of literature, the monthly totals and averages, the ages of the borrowers, and more especially the occupations of the latter, are very suggestive. In these days, when more than ever we have, politically speaking, to “educate our masters,” the record of the work of the Coventry Free Public Library is very gratifying.

WE have received from Tokio a copy of a Japanese scientific journal (apparently the *NATURE* of Japan), which has already reached its third volume and fifty-sixth number. It is printed throughout in Japanese, being much the same shape as *NATURE*, and containing forty-eight pages in each number. The issue before us contains a lecture on human parasites, by Prof. Ijima; some remarks on the historical methods of the Chinese school, by Mr. Suyematsu, formerly of Cambridge; the third of a series of lectures on physical geography by Prof. Kotō; a paper on “Some Phenomena I have witnessed,” and another on methods of treating pebrine, by a teacher in the Kornaba Agricultural College. The notes are also of a very general character: they refer to “some simple physical experiments”; an alloy that expands with cold; the uses of coffee; refining ores by electricity; the strength of paper; a new sweet compound; animal bone industry; hypnotism; the Universal Meridian and Time Conference, &c. Then follow letters to the editor, and finally a report of a meeting of the Tokio Physico-Mathematical Society. No proof is wanted nowadays of the remarkable scientific progress in Japan; if it were, it would be supplied by the fact that a journal of this high character can live and apparently flourish.

WE have also to acknowledge the receipt from the Imperial Meteorological Observatory of Japan of the “Monthly and Yearly Means, Extremes, and Sums for the Years 1883, 1884, 1885,” with an appendix on observations of clouds. There were twenty-seven stations, including four in Yezo and one in Corea.

AN interesting work which has just been published in the *Bulletin* of the United States National Museum (No. xxx. pp. 113-81) is an annotated catalogue of the published writings of Dr. Charles Abrathar White, the distinguished palæontologist to the United States Geological Survey, and the occupant of several other important scientific positions. The editor is Mr. J. B. Marcou, whose object has been to note everything containing any expression of Dr. White's views on scientific subjects, as well as his more elaborate works. The annotations which accompany the catalogue were drawn up mainly from data furnished by the author himself, and all expressions of opinion on geological and palæontological subjects are his own. The catalogue contains in all 151 entries, ranging from articles

in scientific periodicals to his contributions on invertebrate palæontology in the annual reports of the Geological Survey. The whole represents an almost incredible mass of scientific work, performed as it was in a brief quarter of a century, 1860-85.

WE are glad to notice that Dr. White's important work on the Cretaceous invertebrates of Brazil, which were collected by the Imperial Geological Commission under the direction of the late Prof. Hartt, is now in process of publication at Rio de Janeiro by the Brazilian National Museum. It is to appear in the Portuguese and English languages, and will be illustrated by twenty-eight lithographic plates; 214 species in all are published and figured in this work, of which 116 species are diagnosed as new. Four new genera are proposed—three of Gasteropoda, and one of Echinoids. The former are *Orvillia*, *Cylindritella*, and *Cypræactæon*. The latter is *Heteropoda*, the generic diagnosis of which was supplied to the author by Prof. P. de Loriol, of Geneva.

THE following facts exemplify the strong migratory instincts of trout. At the fish culture establishment at Delaford, where the utmost care is taken to isolate the various species of Salmonidæ, a few of the fish occasionally are found in ponds long distances from those in which they were originally located. Considering that each pond is so constructed as to prevent such a contingency, the occurrence is very remarkable, and can only be accounted for in two ways, viz. that the fish either burrow through holes that probably are made by rats and moles, or they jump out of the water and so proceed to the next pond. It is not likely that they are borne thence by birds, as the appearance of the fish on the occasions referred to does not justify such an assumption. It will be interesting to inquire further into the subject with a view of eliciting the real facts of the case.

A FISH Culture Conference is to be held at the Colonial and Indian Exhibition on July 26 at the instigation of the National Fish Culture Association. The Marquis of Exeter will preside, and papers will be read by Mr. J. Willis-Bund, the Rev. C. J. Steward, Mr. Oldham Chambers, and others, upon fresh-water and marine fish. The Conference will commence at 10.30 a.m. and last until 10 p.m.

A PAIR of electric eels (*Gymnotus electricus*) arrived the other day at the Colonial and Indian Exhibition Aquarium from British Guiana, but have since unfortunately died. They were very fine specimens, and measured 4½ feet in length, their normal size being 6 feet. They require a temperature of 75°, and provided the water is maintained at this standard they will live and thrive in captivity. The water should not be too deep, however, and must be kept clean.

FROM the report issued by the Central Meteorological Institute of Sweden for last year it appears that there are thirty-four public stations for observation, and some half-a-dozen private ones, in that country. In addition to these there are nearly 400 places where the fall of rain is registered, and other partial observations made. These observations have been duly published in the Institute's journal, “Monthly *Résumé*” of the weather in Sweden, edited by Dr. H. E. Hamberg, which has now reached its sixth year of publication. In addition to this, the publication of a short climatological description of each country, founded on the observations of the last twenty-six years, has been continued, whilst Dr. Hamberg has added an important contribution in the shape of the work “On the Influence of Forests on the Climate of Sweden.” The twenty-second part of a work “Meteorological Observations in Sweden,” a *résumé* of the observations made at the public meteorological station, has also appeared, and finally synoptical tables have been

framed of the weather at all stations on any day of 1884, showing the quantity and nature of the rainfall, thunder, fog, dew, frost, transparency of the air, "sun-snake" (a phenomenon chiefly observed in the northern part of Sweden), aurora borealis, &c. Reports on the forming and breaking up of the ice have been received from fifty-eight stations, besides seventy-seven observations of periodical features of animal and vegetable nature.

THE Swedish Academy of Sciences has issued a work entitled "The Correspondence of Carl von Linnæus," containing a record of all the correspondents of this famous naturalist, Swedish as well as foreign, with their addresses, date of birth and death, &c., as well as the date of each letter to and from.

THE first African city lighted by electricity was not Algiers or Cairo, but Kimberley, with forty-two Brush lamps, each of 2000 candle-power. The current is also utilised there for the killing of dogs, a step suggesting the execution of death sentences by the same means, as proposed in America and in France by M. Charson, a member of the Senate.

MR. R. N. CUST, the Secretary to the Royal Asiatic Society, is engaged on a work on the languages of the tribes of Polynesia, including those of Australia.

THE additions to the Zoological Society's Gardens during the past week include a Squirrel Monkey (*Chrysothrix sciurea* ♂) from Guiana, presented by Madam G. Sangiorgi; a Macaque Monkey (*Macacus cynomolgus* ♀) from India, presented by Mr. D. Evans; a Rhesus Monkey (*Macacus rhesus* ♀) from India, presented by Capt. Pitman; a Common Cormorant (*Phalacrocorax carbo*), British, presented by Mr. O. Moulton Barrett; two Golden Eagles (*Aquila chrysaetus*) from Scotland, a Lined Finch (*Spermophila lineola*) from South America, deposited; two Ostriches (*Struthio camelus* ♂ & ♀) from North Africa; a Lear's Macaw (*Ara leari*) from South America; a Lineolated Parakeet (*Bolborhynchus lineolatus*) from Mexico, purchased; a Bennett's Wallaby (*Halmaturus bennetti* ♀), a Vulpine Phalanger (*Phalangista vulpina* ♂), three Canadian Beavers (*Castor canadensis*), born in the Gardens.

OUR ASTRONOMICAL COLUMN

THE STRASBURG OBSERVATORY.—Herr W. Schur has published, in No. 2736 of the *Astronomische Nachrichten*, a supplementary report on the work done at the Strasburg Observatory during the ten months preceding May of this year, so as to exhibit the state of the instruments and of the computations relating to the observations made with them on the eve of his departure for Göttingen, where he has been appointed Director in the room of the late Prof. Klinkerfues. During the interval to which the report refers, Herr Schur was chiefly occupied with observations of the moon with the altazimuth and of comets with the great refractor, also with the examination of the micrometer-screw of the latter instrument. The meridian-circle has chiefly been employed in the observation of southern stars—amongst others the eighty-three stars of Auwers' Southern Fundamental Catalogue, and certain stars for investigating astronomical refractions. The direct and reflection observations to the end of the preceding year give for the geographical latitude of the meridian-circle, $+48^{\circ} 35' 0''.11$, which agrees well with a former determination with Repsold's transit, using Horrobow's method, viz. $+48^{\circ} 35' 0''.23$. In former reports Herr Schur has drawn attention to the discordance between the nadir points determined with observer north and observer south, which, for his observations, amounts to a considerable quantity; in the mean, from a large number of observations, $\frac{1}{2}$ (north-south) being as much as $+0''.50$. This large value agrees both in sign and in magnitude with the quantity determined from observations of zenith stars for similar positions of the observer, viz. $0''.77$, and Herr Schur concludes that his observed zenith distances of stars require a correction of about $-0''.6$. In the case of the other Strasburg observers, the corresponding correction is comparatively insignificant. Herr Schur's successor at Strasburg is Dr. Kobold.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1886 JULY 18-24

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on July 18

Sun rises, 4h. 6m.; souths, 12h. 5m. 56'.5s.; sets, 20h. 6m.; decl. on meridian, $21^{\circ} 1' N.$; Sidereal Time at Sunset, 15h. 52m.

Moon (two days after Full) rises, 20h. 42m.*; souths, 1h. 31m.; sets, 6h. 27m.; decl. on meridian, $14^{\circ} 5' S.$

Planet	Rises h. m.	Souths h. m.	Sets h. m.	Decl. on meridian
Mercury ...	6 41 ...	13 54 ...	21 7 ...	$13^{\circ} 21' N.$
Venus ...	1 33 ...	9 38 ...	17 43 ...	$21^{\circ} 46' N.$
Mars ...	11 3 ...	16 48 ...	23 33 ...	$3^{\circ} 38' S.$
Jupiter... ..	10 9 ...	16 18 ...	22 27 ...	$0^{\circ} 58' N.$
Saturn... ..	3 7 ...	11 15 ...	19 23 ...	$22^{\circ} 20' N.$

* Indicates that the rising is that of the preceding evening.

Occultations of Stars by the Moon (visible at Greenwich)

July	Star	Mag.	Disap.	Reap.	Corresponding angles from vertex to right for inverted image
19 ...	ϵ^2 Aquarii...	5½ ...	3 30	near approach	35° —
19 ...	ϵ^1 Aquarii...	6 ...	4 1	near approach	220 —
24 ...	μ Ceti ...	4 ...	23 32	0 24†	52 267

† Occurs on the following morning.

July	h.	Mercury at greatest elongation from the Sun,
19 ...	10 ...	27° east.

Variable Stars

Star	R.A.	Decl.	h. m.
U Cephei ...	0 52.2 ...	81 16 N. ...	July 18, 23 32 m
R Piscium ...	1 24.8 ...	2 18 N. ...	" 23, 23 11 m
S Ursæ Majoris ...	12 39.0 ...	61 43 N. ...	" 24, M
V Bootis ...	14 25.2 ...	39 22 N. ...	" 22, M
U Coronæ ...	15 13.6 ...	32 4 N. ...	" 21, 22 22 m
U Ophiuchi...	17 10.8 ...	1 20 N. ...	" 22, 2 58 m
X Sagittarii...	17 40.4 ...	27 47 S. .	July 22, 23 6 m
U Sagittarii...	18 25.2 ...	19 12 S. ...	" 19, 2 0 M
S Vulpeculæ ...	19 43.7 ...	27 0 N. ...	" 24, m
χ Cygni ...	19 46.2 ...	32 38 N. ...	" 18, m
S Delphini ...	20 37.8 ...	16 41 N. ...	" 22, M
δ Cephei ...	22 24.9 ...	57 50 N. ...	" 18, 21 30 m

M signifies maximum; m minimum.

Meteor Showers

Meteors begin to be somewhat numerous in the latter half of the present month. Amongst the radiant represented are the following:—Near π Andromedæ, R.A. 10° , Decl. $38^{\circ} N.$; near β Cassiopeiæ, R.A. 6° , Decl. $58^{\circ} N.$; near η Draconis, R.A. 245° , Decl. $64^{\circ} N.$; near σ Serpentis, R.A. 266° , Decl. $12^{\circ} S.$; near α Cygni, R.A. 312° , Decl. $46^{\circ} N.$; from Lacerta, R.A. 342° , Decl. $40^{\circ} N.$; and the great *Pervid* shower, maximum August 10, radiant R.A. 45° , Decl. $56^{\circ} N.$, begins to furnish individual meteors about this time.

GEOGRAPHICAL NOTES

ACCORDING to the *Colonies and India*, the Secretary of the Victorian branch of the Geographical Society of Australasia has written to the Royal Society of Victoria asking the latter to appoint a committee to confer with that already appointed by the former Society on the question of sending an exploring expedition to the Antarctic regions. It is urged that a conference should take place as soon as possible, and that various scientific associations should be invited to co-operate in sending out one or more expeditions.

THE latest news from the Chitral Mission is that Col. Lockhart is returning to India from Zebah, in Badakshan, leaving Col. Woodthorpe in charge of the party.

It is stated that Mr. A. R. Colquhoun, who is at present Civil Commissioner at Mogoung, in Upper Burmah, is about to start